Table 3-5. Detectable concentrations of radium isotopes in NTS monitoring wells sampled in 2003

Monitoring Location	Date Sampled	^{226}Ra ± Uncertainty[(a)] (MDC) (pCi/L)				^{228}Ra ± Uncertainty (MDC) (pCi/L)			
SM-23-1	3/24/2003	0.501	±	0.279	(0.346)	2.37	±	0.72	(0.882)
UE-5C (Water Well)	1/28/2003	0.357	±	0.212	(0.237)	1.08	±	0.55	(0.984)

The EPA established MCL in drinking water for ^{226}Ra + ^{228}Ra is 5 pCi/L

(a) ± 2 standard deviations

3.1.3.5 NTS E Tunnel Ponds

Five primary basins were constructed to collect and hold water discharged from the onsite E Tunnels in Area 12 where nuclear testing was conducted in the past (see Figures 3-3 and 6-4). The water is perched groundwater that has percolated through fractures in the tunnel system. The Defense Threat Reduction Agency (DTRA) conducts monitoring of effluent waters from E Tunnel to determine if radionuclides and non-radiological contaminants exceed the allowable contaminant levels regulated under a state water pollution control permit (NEV 96021), which is issued to DTRA. During October, 2003, water was sampled from the tunnel effluent near where water is discharged, from the pond influent (which at the time was flowing into Pond 2), and from Ponds 2 and 5 themselves. Sediment was also sampled from the basins of Ponds 2, 4, and 5. Effluent water was analyzed by DTRA for tritium, gross alpha, and gross beta (Table 3-6). All other samples were analyzed by BN for tritium (water samples only), gamma-emitting radionuclides, uranium, plutonium, ^{90}Sr, and ^{241}Am (Table 3-7).

The majority of samples had radionuclide concentrations above minimum detectable concentrations (MDC) (Table 3-7). While tritium concentrations in tunnel effluent were elevated, they were about 12 percent lower than the limit allowed under permit NEV 96021 for that discharge system (Table 3-6). Tritium was found in all pond inlet and pond water samples at concentrations analogous to previous years' samples except the sample from Pond 5, which was approximately one third lower. This was probably due to the fact that Pond 5 did not receive tunnel effluent during 2003 and precipitation diluted the original concentration. Concentrations of ^{90}Sr, ^{137}Cs, plutonium, and ^{241}Am were also at levels comparable with the past two years. In samples for which it was analyzed, uranium was detected in both water and sediment samples, but was determined to be naturally-occurring, based on the activity ratios of ^{238}U/^{235}U and ^{238}U/$^{233+234}$U not being different from 20 and 1, respectively (PHS, 1970).

Due to the elevated concentrations of radionuclides in the containment ponds, they are fenced and posted with radiological warning signs. Given that the ponds are available to wildlife, game animals are also sampled under RREMP monitoring to assess the potential radiological dose to humans via ingestion of game animals and to evaluate radiological impacts to wildlife (see Section 6.0 and Section 7.0).

Table 3-6. Radiological results for E Tunnel Pond effluent pertaining to Water Pollution Control Permit NEV 96021

Parameter	Permit Threshold/Permissible Limit	Average Measured Value
Tritium	1,000,000 pCi/L	885,000 pCi/L
Gross Alpha	35.1 pCi/L	12.75 pCi/L
Gross Beta	101 pCi/L	54.45 pCi/L

Source: *Water Pollution Control Permit NEV 96021 Quarterly Monitoring Report and Annual Summary Report for E Tunnel Waste Water Disposal System* (DTRA, 2003)